OLD AGE—ITS CAUSE, WITH A REMEDY AND PREVENTIVE

BY

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OLD AGE—ITS CAUSE, WITH A REMEDY AND PREVENTIVE

By Virginia May Broun

"Let there be Light."

"For I have no pleasure in the death of him that dieth saith the Lord God, wherefore turn yourselves, and Live Ye."—
Ezek. 18:32

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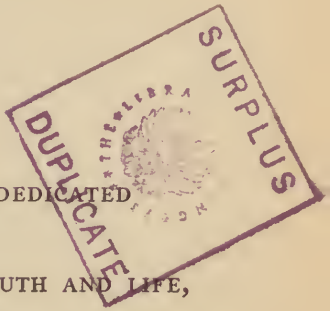

THIS BOOK IS DEDICATED

TO

ALL LOVERS OF TRUTH AND LIFE,

ESPECIALLY THOSE IN THE

MEDICAL PROFESSION,

TO WHOSE INDIVIDUAL CONSIDERATION

IT IS SUBMITTED.

FOREWORD

The greater part of the following study in Physiology was published originally in *Health Culture Magazine* for May, June and July, 1921.

Generous expressions of approval from physicians and others, together with the present need for consideration of the question of the decrease in blood volume with age, on account of its relation to high blood pressure and treatment for the same, have led to the publication of this enlargement of the original article.

It is a pleasure to state too, that an experimental course of the treatment suggested for the hair,—massage with the head low, and without applications of any kind,—has been even more successful than was anticipated, since in a test case it has already largely restored the natural color in long white hair, and also brought out a new growth of the original color, making the mass of hair much heavier and darker.

V. M. B.

January, 1923.

Old Age—Its Cause, With a Remedy and Preventive

By Virginia May Broun

"The proper study of mankind is man," said Pope.

The imperfections of old age have always been a proposition which every human being might expect to find himself confronted with in time. The subject is therefore of such universal interest that any contribution toward sovling the problems of that period, if it has any reasonable basis whatever, needs no apology.

The ideas explained below occurred to me while considering certain phases of human physiology, and although they are based on the most well-known laws of nature, they seem in some mysterious way to have heretofore escaped observation.

Have you ever noticed where the first signs of age appear? They are in the hair, or the

absence of it, on the very top of the head,—and where the Force of Gravity is most active in reducing the blood supply. Next come the eyes and muscles of the face, the next highest parts, the eyes becoming weakened and the muscles sunken and wrinkled from the same cause, loss of blood.

Only those parts of the body that are located above the heart, or which the blood has to rise above the heart to reach, as the hands, ever get wrinkled with age. Nearly all the signs of age, as defective sight and hearing, imperfect teeth, loss of mental power, are located in the head, the top of the body, on which the force of gravity is constantly acting as a drain except when we are lying down with our heads on a level with the body. This few of us ever do, as the general custom is to use pillows that more or less elevate the head.

How much effect gravity has on the amount of blood in the different parts of the body may be readily seen by noticing the different ap-

pearance of the two hands after holding one up and the other down for a few minutes.

Probably most people have learned that after being on the feet a long time the quickest way to rest is to lie down and elevate the feet. The benefit in elevating the feet comes from changing the direction of the force of gravity on the blood in the parts affected.

If the whole body is placed on an inclined plane or bed with the head downward, the head and upper parts get the benefit of this extra flow of blood, resulting in feelings of refreshment and exhilaration. If persons showing signs of age will make a practice of resting or sleeping in this position, they will soon be able to see the beneficial effects. An adjustable bed had best be used, capable of different elevations at the foot. A high elevation might be maintained a short while at first, and then the foot let down to just a sufficent slant throughout the night to keep the blood in the head and the upper part of the body,—thus counterbalancing the effect

of the opposite condition which exists during the day.

The result must inevitably be improvement of the organs of special sense located in the head, as well as the mental powers acting through the brain, and of the hair, the teeth and muscles of the face.

It is reasonable to expect all of the organs of the body to be benefited by this treatment, for the blood must be unequally distributed between the upper and lower parts of the individual organs just as it is between the upper and lower parts of the body. To equalize this blood supply over the whole organ cannot but contribute to its life and efficiency.

The inclined position will also relieve the weight of those organs which rest upon each other during the day, and so tend to a general counterbalancing and equalizing of the pressure on the different sides of the organs.

Aided by intelligent massage, it should be especially helpful in cases of the falling of

any organ of the body, as well as in preventing such cases. In treatment of the blind, the deaf and the dumb, it may be found that the additional food and oxygen thus furnished to the organs will enable them sometimes to resume their normal functions.

It would seem that a healthy young person habitually using this position during a good part of the time that he is lying down should remain young, for with all the organs, and all the parts of the organs equally supplied with the food and life-giving blood, they would have no excuse for deteriorating on account of time alone. The heart, however, would have to work somewhat against gravity even on a slight incline, so it would probably be best to have occasional nights of sleeping on a level in order to make the work of that organ as easy as possible.

When it is desired to hasten the good effects of this treatment, and also to double the good effects of ordinary massage, let it be taken with the body in this position. Massage

of the scalp when all the arteries are flooded at the start with life-giving blood must necessarily result in the improvement of the hair. So also with the muscles of the face and neck.

Bodily massage too, is most effectively taken in this posture; especially that of the abdomen for constipation. The reason for this is that the difficulty is said to be usually with the ascending colon where the action of the intestine is normally opposite to the force of gravity.

Dr. William Brady, who writes the Health Column in a number of newspapers, is an enthusiastic advocate of somersaults as a cure for various ills, among which he mentions the following:

Auto-intoxication from intestinal stasis, constipation, difficult digestion with flatulence (gas), poor circulation, especially cold feet, sallow complexion and so-called "liver spots," the blues, sometimes called splanchnic neurosthenia.

He gives the following explanation of the beneficial effects of somersaults:

"In the abdominal cavity and the lower part of the thoracic cavity are innumerable blood-vessels capable of holding more than one-fourth of the entire mass of blood in the body. This is the great Splanchnic Pool, which, in persons of too much dignity, as in women who wear corsets to hold them up, is likely to be stagnant. Somersaults stir up this stagnant pool and put the blood back into circulation again where it belongs. That is one way in which the complexion becomes rejuvenated and cold feet remedied.

"The alimentary tube is subject to kinks and sags and all sorts of obstacles incident to our upright posture. Somersaults unkink the kinks, take out slack, and help to overcome the obstacles. Hence, the relief to auto-intoxication and constipation and flatulence and digestive difficulties.

"Somersaults are a simple mechanical measure, and should in no sense be confused with exercise. It is no exercise to turn six consecutive somersaults every night and every morning. It is a very trifling pastime,

a feeble acknowledgment of the account we must settle with Nature for having risen on our hind feet."

Though the doctor says that no one can be too young or too old, too stout or too thin to turn somersaults, it is not probable that he can induce everyone to take the treatment. Those who are too skeptical or lacking in courage to do so may find a good substitute in a vigorous bodily massage taken on an inclined bed with the foot at its greatest elevation. So, by standing practically on our heads for a time, we may atone for standing on our "hind feet" at other times.

Most forms of physical culture require some effort and some time for practice, which it takes a strong will to persevere in giving it. Much of the physical benefit to be had from using an inclinded bed comes without effort. In fact, it marks the cessation of all effort except when we combine self-administered massage or exercise with it. And the time used is only that which we usually spend in

rest. This is one of the cases where we only have to adjust ourselves to the law of Nature, and she does the rest. The natural inclination is not to neglect the treatment, but rather to indulge in it whenever possible.

Dr. Robert B. Armitage in his book "How to Stay Young" quotes Thomas A. Edison as saying: "My grandfather early in life, became fascinated with the story of the great Venetian, Louis Cornaro, who, when he found himself a wreck in middle life, reformed his diet, and by keeping it right, managed to live more than 100 years. After that my grandfather ate carefully too and lived to be 104 years of age. No disease killed him. He was perfectly well up to the time that he died. He simply lost interest in life. The cells of which his body was composed were anxious to get away. So my grandfather told his children that he was going to his daughter's house to die. He went to her house, undressed, went to bed and died. There was nothing the matter with him. He was

simply tired of life. My father died the same way."

Dr. Armitage adds: "From the present indications it seems that Edison will live as long as his father or grandfather, and we trust that this great man, who has done so much to enrich the world, will live his full allotted time; and that he will retain the full possession of all his faculties to the end and that he will only pass on when the cells of his body become anxious to disintegrate."

Now the question is, why do the cells ever wish to disintegrate? Is it not in response to the call of their Mother Earth sent through the force of gravity? And when the call comes has not this same force been gradually undermining them for years, especially those located in the brain, the seat of the consciousness of life, and so reduced them in number, vitality and power, that the Life force in them is no longer able to cope with the Matter? Let us try feeding the cells of that most vital organ, the brain, and see if Life, which is

superior to matter, will not gather up her forces and so assert herself that the cells will abide with her with joy, and no longer wish to get away, to disintegrate and return to Mother Earth.

It is to be remembered too that in the brain are situated those two mysterious and little known organs, the pineal and pituitary glands, which are thought by some to be respectively the seats of the soul and of spirituality and genius. If the organs of such high powers are kept in better physical condition it may enable the race to take further steps forward. Physiologists have found that a diminished activity of the posterior lobe of the pituitary body produces a tendency to obesity. The large number of persons exhibiting this condition in later life may be due to an imperfect functioning of this gland.

In the same book Dr. W. A. Hammond, former Surgeon General of the U. S. Army, is quoted as declaring that "with the knowledge

of physiology and the science of life we possess today, there is no reason why the human body should ever deteriorate, and from a scientific standpoint, *man should be able to live indefinitely.*"

But the body has continued to deteriorate in spite of all this learning. Is it not because gravity has been overlooked, and not provided against in the human machine?

The first chapter in the book referred to contains the following statements:

"For the past seven years many scientific men have been experimenting to find out the secret of the maintenance and renewal of the tissues of the human body. They are at last about to discover the great riddle of life and death in the body. A new world is about to open before us.

"The life cell holds the secret of staying young. One-third of the human body is composed of live cells, and two-thirds of it of dead cells. In order to keep the body young, new life cells must form as fast as the old break

down. These countless millions of dead cells are responsible for forming the most deadly poisons known to nature. They are the poisons that bring on old age and decrepitude and cause sickness and death if not eliminated.

"There are two kinds of death. There is the death of the whole body, that may be caused by injury to one part alone, as the heart or brain. The other parts are really alive but the machinery has stopped. . . . *When, however, death occurs as the result of a general bodily collapse, nothing can be done.*

"In order to keep the body young, we know that we must constantly supply new material to take the place of that which is used up. . . . Each part of the body renews itself through its own impulse and repairs its own waste by a system of home rule, if you supply the right kind of food for its use. If any part of the body becomes defective, the general health is, of course, affected.

If the brain is in bad condition, all other organs suffer."

". . . . Experiments have recently been made to prove that bodies may weaken and show the approach of age and then be revived and put back to youth again.

"The world's greatest scientists declare that while the general body of a human being is doomed to die in time, each and every part of it may be made to live forever if the proper care and attention be given it."

The author of this book attributes the imperfections of old age to an excess of mineral matter in the food and water used. He says: "The veins and blood vessels of the heart, as well as the arteries, become coated with a deposit of lime and other mineral matter which will prevent the repair of the tissue and result in a thinness of the parts that may at any time give away. The blood passages leading to the brain are likewise clogged and made thin and brittle. The finer veins of the brain itself become clogged up with

this mineral coating and there is a hardening of the tissue and lessening of the flexibility of that organ. Memory naturally is impaired, and the power to think is weakened and new ideas are not received.

"All the tissues and membranes become clogged; the stomach hardens and is no longer able to digest animal fats. The ganglia and nerves which are the storage centers of vitality, are deprived of their flexibility, and do not vibrate to the feelings and powers of life as they should.

"Therefore to keep the body from growing old, after it has secured its natural growth, you must reduce the mineral matter, supplying only just enough for bone repair. . . .

"If you eat a diet that contains a heavy excess of mineral matter your body will be sure to get old. The arteries will harden and then old age has set in. This is the secret of old age. You can remain young if you eat correctly.

"The eyes are usually the first part of the

body to indicate age. The sight becomes dim. The chief cause of this is the condition of the blood. Fully ninety-nine per cent of eye troubles are due to impure blood. The kind of blood, you must remember, is determined by the food eaten. The old age deposits harden the nerves that support the vision. . . .

"If the roots of the hair are imbedded in these mineral deposits the scalp is not healthy and as a result the roots of the hair die, and dandruff scales appear. It will never do you any good to apply anything on the scalp until you get at the real source of the trouble, the stomach. Still millions of people are trying all sorts of things to grow hair and will continue to try in vain so long as they load the stomach with a ceaseless supply of wrongly selected foods and drinks."

While fully recognizing the importance of proper food in right quantity it may be asked if instead of all these old age infirmities being the result of impure blood, or blood containing an excess of mineral matter, could

they not just as easily and indeed more reasonably result from an insufficient supply of blood to the organs exhibiting them? And this particularly in the eyes and brain, the constant use of which would naturally call for an extra supply of nourishment.

The blood we know performs the double function of carrying food and oxygen and the body secretions to the cells and removing the waste matter and carbon dioxide from them. If there were a sufficient flow of it, and of the lymph which is formed from it, would they not carry off these mineral deposits with the other waste matter? This seems to be indicated by the fact that massage of the scalp, even in the ordinary way with the head elevated, causes the hair to grow more or less, and this must result from an increase alone in the blood supply, as no change takes place in its composition.

The lymph, according to the physiologies, is the blood plasma which has percolated through the walls of the capillaries into the

spaces between the cells of the tissues. It is said to bathe all portions of the body not reached by the blood, and to carry to the cells the material each cell needs to maintain its functional activity, and to pick up and return to the blood (through the lymphatics) the products of this activity; which products may be simple waste, or matters capable of being used by some other tissue. It is also said to carry back to the blood those white corpuscles of the blood which escape, as does the lymph itself, through the walls of the blood vessels, and to carry a number of inorganic salts from the tissues to the blood. The white corpuscles of the blood, too, are said to contain inorganic salts, and one of their peculiarities is that while circulating in the blood vessels "they keep close to and even seem to adhere to the walls of the blood vessels, while the red cells keep in the middle of the stream."

These characteristics of lymph and of the white corpuscles suggest that a decreased volume of the lymph and of blood may be

responsible for the mineral deposits left behind them.

If this be true, the mineral deposits are a result, and not a cause of old age.

It seems sufficiently evident to ordinary view to justify its assumption as a fact that the proportion of blood in the human body decreases as the person grows older.

An examination of a number of the most recently published physiologies for the use of medical students and trained nurses, seems to indicate that the subject of the smaller amount of blood existing in older people has never been studied in any way or apparently even recognized to be a fact; therefore no explanation is given for it. It is hard to understand why such a vitally important question has remained so long uninvestigated. Other interesting and important questions connected with this are, what organ controls the amount of blood formed in the body, and where is it formed? Where does the material for its manufacture come from during a pro-

longed fast,—also what changes result in the composition and amount of the blood after such a fast?

Dr. William H. Howell, of Johns Hopkins University, in his 1921 Physiology for Medical Students, states that

"The total quantity of blood in the body has been determined approximately for man and a number of the lower animals. . . . On man we have upon record two determinations on guillotined criminals made by Bischoff, which gave 7.7 and 7.2 per cent (of body weight). Haldane and Smith, however, have devised a modification of Gréhant's carbon monoxid method, which they have applied to living men. (Haldane and Smith, *Journal of Physiology*, 25, 331, 1900; also Zuntz and Pletsch, *Biochemische Zeitschrift*, 47, 1908.) The results of some seventy-four experiments gave them an average value of only 5 per cent for man."

The figures he gives corresponds with those given in a number of other recent physiolo-

gies, and their uniformity suggests that they were all obtained from the same experiments, conducted twenty years ago.

As none of the authors mentions the age of the men whose blood was weighed it may be inferred that neither this factor nor the amount of adipose tissue was considered in making the estimates. Adipose tissue being such a widely varying quantity, not only in different individuals, but in the same individual at different times, and of course containing no blood, it would seem to make very indefinite all comparisons of the amount of blood with the body weight. Might not a more stable comparison be made with the height of the person, taking also into consideration the age?

And as the pulse decreases with age, varying from "130 beats per minute at birth to 100 at 3 years old, 72 in adult life, and 65 in old age," the last two subject to variations, it would seem that there must exist a definite relationship between the normal heart beat

per minute and the proportion of blood in the body, both decreasing from birth to old age.

In an article on Muscular Atrophy, Dr. W. C. Kraus states as follows:

"Wasting of the muscles is one of the most prominent of the objective symptoms of brain and cord disease. However, the wasting of muscles occurs also independently of any nerve or muscle lesion, when it is due to physiological changes, or the active cell growth is no longer predominant, and has been succeeded by a period of cell decay. Inasmuch as there are atrophies due to physiological and also others due to pathological processes, it is of the utmost importance to distinguish between them.

"Generally speaking, physiological atrophy occurs as the result of the decadence of the vital powers due to senile changes. It is not attributable to any direct lesion and the atrophy is considered as active."

Could not this decadence of vital powers causing "physiological atrophy" of the mus-

cles, cause also a decrease in the amount of blood in the body (which probably caused the atrophy), and be produced itself by an insufficiently nourished brain as well as by a diseased one? As the Medulla Oblongata regulates the heart action and circulation of the blood generally, does it not seem probable that this organ is also responsible for the amount of blood formed in the body?

The thinness of the walls of the blood vessels would be a natural result of a smaller quantity of blood, just as muscular shrinkage is.

This idea seems supported by the results following artificially produced anemia in the medulla of animals, as described in Dr. Howell's Physiology in the paragraphs on Intracranial Pressure. Quoting:

"In anesthetized animals submitted to such a condition it has been shown that a compensation takes place; the anemic condition of the medulla stimulates the cardio-inhibitory center, causing a slower heart beat; at the

same time it stimulates also the vasomotor center, causing general vasoconstriction in the rest of the body, the result of which is to raise the arterial pressure and reëstablish the cranial circulation (Cushing)."

The slower heart beat and high blood pressure being both characteristics of age and a decreased blood supply, might they not in this case be simply an adjustment of nature to a smaller amount of blood called forth by the anemic Medulla?

The following passage in the description of the functions of the Medulla Oblongata also suggest this view.

"If the medulla is severed from the portion of the brain lying anterior to it the animal continues to live for a considerable period. The respiratory movements are performed and the blood-vessels retain their tone so as to maintain an approximately normal blood-pressure. On the contrary destruction of the medulla, or severance of its connections with the underlying parts, is followed by a cessation

of respiration and a loss of tone in the arteries, either of which results in the rapid death of the organism as a whole. . . . In addition to the control of the respiration and circulation other important reflex activities are effected through the medulla by means of the vagus nerve, which has its nucleus of origin in this part of the brain. Such, for instance, are the reflex control of the heart through the cardio-inhibitory center and of the motions and secretions of the alimentary canal."

If the absorption of water in the alimentary canal is also controlled by the medulla and the water forms the main source of the water content of the blood, it seems evident that the amount of blood is thus directly under the control of the medulla.

The great question for experimental physiologists to answer is, how to increase the amount of blood formed in the body, or how to stop its decrease as the years go by. But they do not seem to be working in this direction at all, since they have not yet used the

knowledge gained twenty years ago of how to estimate the total volume of blood, to establish or disprove the apparent fact of its decrease with age. This would necessitate repeated tests on the same individuals throughout a number of years, as there is reason to believe that the amount varies greatly in different persons even when of the same age and height. And also that the same individual must be subject to fluctuations, more or less temporary, in the amount of blood, according to the state of health, condition of fatigue, length of time since a meal, etc. It seems hardly possible for this to be otherwise when we consider how fast it is used up by both physical and mental exercise and by strong emotions, and then the resulting feeling of fatigue until the normal supply is restored by a good rest, a good meal, or both.

And though the physiologists agree that the total amount of blood in a person's body remains about the same but varies in distri-

bution according to the needs of the different parts, there seems to have been no consideration given in the science of Physical Culture to the self-evident fact that when excessive development is maintained in one part of the body it must be at the expense of some other part or parts. And so no warning has been given to the professional "strong man" that he is maintaining his huge and useless muscles at the cost of sound vital organs, or to the beauty-loving woman that she is cultivating her hair and face to the detriment of eyes and brain. The truth of the last statement is based on the fact that the two arteries on each side of the neck, the External and Internal Carotids, being formed by the division of the Common Carotids into these two branches, it follows that when the External ones which supply the face, scalp, ears, etc., are called upon by massage for a larger amount of blood, there must necessarily be a smaller amount left for the Internal ones which support the brain and eyes.

No one would want to cultivate luxuriant hair and full facial muscles at the expense of eyes and brain, especially as the condition of the brain affects all the rest of the body as well as the mind. When the massage is taken with the head lower than the rest of the body, however, a compensation to the eyes and brain takes place through the action of gravity, which also increases the blood in the External arteries. And after the desired effects are accomplished they will still require more than their previous proportion of blood to maintain them, and this loss to the Internal arteries should be made up to them in the same way as during the massage, by the person sleeping with the head lowered during the night, or by resting in this position some time within the day.

It is not probable, however, that many women have injured either brain or eyes by excessive massaging of scalp and face. The fact is that the internal parts of the head require so much more blood than the external,

the brain alone, according to one author, utilizing about one-fifth of the entire quantity in the system (though this of course depends on the amount of mental work done), it is most likely that the extra amount called to the outside by massage would not be seriously missed on the inside.

But that there is such a counterbalancing relation in the blood supply between the internal and external parts of the head is well illustrated by such cases as the following.

This is a psychologist's account of a circumstance said to have been originally described in the London *Lancet*: "An English lady, disappointed in love in her early years, became insane, and lost all account of time. Believing that she was still living in the same hour which parted her from her lover, taking no note of years, she stood daily before the window, watching for his coming. In this mental state she remained young. Having no consciousness of time, she literally grew no older. Some American travelers saw her

when she was seventy-four, and supposed her a young lady. She had not a wrinkle or gray hair, but youth sat gently on cheek and brow. Asked to guess her age, those unacquainted with her history conjectured that she must be under twenty."

This occurrence was used by the psychologist to prove that it is the consciousness of years that causes the body to age. While this is doubtless true to some extent in our present stage of existence, it may be asked why did the body age before we ever attained the consciousness that such a thing was likely to happen?

A more reasonable explanation seems to be that this young woman having lost the power of mentation had the large supply of blood usually consumed in that process, and also the other considerable quantity ordinarily required by the eyes when used for any intelligent purpose, both set free to be used equally by all parts of the head, and that consequently the external parts, the cheeks, the

hair, etc., and also the Medulla Oblongata, were abundantly supplied with blood.

This interpretation of the circumstance seems to be sustained by the facts given in a somewhat similar account furnished by one of our own physicians, Dr. W. H. Vail, of Newark, N. J.

He states that on one occasion some years ago, he was called in consultation to see a well-to-do farmer of about 60 years of age, who had always enjoyed excellent health with the exception of periodic attacks of illness resulting from the excessive use of alcoholic stimulants. At this time his mind and physical powers both had deteriorated, and he was suffering from dementia and mild delirium. The doctor advised the complete cutting off of all stimulants, and a simple diet of oatmeal gruel, bread, milk, and soups. This course being followed, it was very noticeable how rapidly the patient recovered his bodily strength, though his mind was too far gone to resume its functions.

He lived some four months and during that time it was remarkable, the doctor says, to witness his hair. At the beginning of this period it was as white as snow, but it gradually grew darker, until before his death, it became as black as a crow. The friends who had known him in his earlier life said that he then looked just as he had thirty years before.

In this case also a more equal division of the contents of the Common Carotid arteries between the internal and external parts of the head, and also of the internal arteries between the Medulla and Cerebrum during the inactivity of the latter, and its freedom from alcoholic stimulation, may have been the cause of this remarkable phenomenon.

Sudden mental or emotional shocks seem to almost burn out the tissue of the cerebrum, which in its extremity of need makes a sharp demand upon its neighbors' supply of blood. The result is visible sometimes only in the blanched cheek, but if the shock is of a more serious nature the hair may lose its color in as

short a time as overnight. Many instances have been recorded of this, though it is not supposed that all of these meant that the entire head of hair became completely white in that time. Remembering that the hair changes color, or rather loses color, by a complete change in the individual strands and that these strands are usually distributed evenly throughout the mass of hair, it can easily be seen how it might occur right before one's eyes and still be so gradual in the general effect produced as to escape notice at the time. But the next day, on again seeing the person, the observer might be quite startled at the extent of the change and insist that it all took place "in the night," as they are generally said to do.

Sometimes the Cerebrum robs a nearer and vastly more important neighbor, the Medulla Oblongata, and the consequent inability of this organ to function normally has given rise to the expressions "It took my breath away," or, "It made my heart stand still,"

which may be interpreted in something of a literal sense. Its anemic condition sometimes causes fainting (the best remedy for which is to lower the head) and probably most of the sudden deaths that occur on the receipt of some distressing news, are the result of the same cause.

If this condition is kept up for any length of time, as during a prolonged mental or emotional strain, the effects on the whole body are the same as those produced by old age,—hence we hear such expressions as "She has aged ten years in the last month," etc. These facts sustain the views expressed elsewhere in this book that old age effects are caused by a lack of blood, and the lack of blood is the result of an anemic Medulla Oblongata. The anemic Medulla is caused in the one case by a stronger call to the blood by the Cerebrum, in the other by the long-continued action of gravity.

With many people there is still another cause which limits the supply of blood to the

head as well as to the rest of the body. And this is the fact that they do not, for one reason or another, take sufficient water to supply the needs of the system in both its blood making and irrigating necessities. The blood is reduced in quantity as well as in quality by this lack, according to good authority, who also states that water should be taken freely with meals, as well as between them. The need of blood is manifested in a general dryness of the skin, brittle nails and sometimes by the loss of color in the hair of quite young persons.

The common source of supply for the internal and external parts of the head is another cause for the first signs of age appearing in the hair and face. For the brain and eyes, being the most constantly worked organs in the head, their exercise requires a full supply of blood, and as age creeps on and the quantity of blood diminishes, there is not enough left in the common Carotids after the demands of brain and eyes

are provided for to keep up the comparatively inactive muscles of the scalp and face.

And when we consider the fact that the scalp really contains no muscles, except a thin, narrow patch on either side of the base of the skull, and another over the ears, and that thus the large area on the top of the head is entirely without the power of motion,—motion, which not only attracts, but demands blood—is it surprising that the hair there shows lack of nourishment sooner than any other part of the body? It is like a speechless child, in an isolated position, unable to demand its own when the limited supply is barely sufficient to go around among the various other clamoring organs of the body.

The tissue of the scalp which contains the blood vessels between its layers, the superficial facia, in this region is firm and dense in structure, and contains fewer arteries than the muscles do.

The patches of muscle around the base and front of the skull forming the Frontalis and

Occipitalis muscles, vary considerably in size and shape on different individuals according to Gray's Anatomy, and either one may be absent altogether. Their exercise draws more blood to the skin vessels supplying the hair, so we often see heads bald everywhere except over these muscles. Their variety in shape and size may well account for the continuance of the same patterns in the bald spaces said to be frequently seen through successive generations of the same families. That is, it is the shape of the scalp muscles that is inherited rather than the baldness.

It seems probable that these muscles are more extensive with women than with men, since women are so rarely bald, but anatomists do not seem to have paid any attention to this question.

It is an established fact, however, that if a sufficient quantity of blood can be drawn to the scalp, it will restore the hair where it has been lost, and also restore the color in white hairs. Here it may be said that there is no

such thing as *gray* hair except in the general effect of the whole mass. Each strand is either entirely white or entirely of the natural color, except in rare instances the coloring is divided in different parts of the strand, and either end may be white or colored.

The length of time it takes to restore the color in hair depends on how fast you can increase the blood supply to its roots. So of course it will take longer to restore it in an elderly person than a younger one, and in a thin-blooded person than a full-blooded one, because they have a smaller volume of blood to draw on; and also the scalp may have been depleted so long that some of the capillaries may have become obliterated, dried up.

But massage with the head low will do more to restore these, and the color at the same time, than anything else. In fact, this is the only way in which the natural color has ever been regained in any degree, so far as I am aware. It has been done in this way, and in long hair, without the aid of any application

whatever. The restoration would probably have taken place more rapidly if some penetrating oil, as kerosene, had been used now and then with the massage, just to soften the scalp and let the arteries expand more easily, but this was purposely omitted in this test just to see if the object could be accomplished without it.

The method used is to place the body in an inclined posture, head down, and then massage the scalp *without rubbing it.* Place the finger tips of the two hands a half inch or so apart on the head, and holding one hand down firmly, with the other one press the scalp back and forth against it, so as to loosen the scalp from the skull as much as possible. Also run the fingers through the hair, catch hold of it, and lift the scalp in this way from the head. This is simply pulling the hair in handfuls. It helps in loosening and thickening the scalp, and drawing more blood to the roots of the hair.

For restoring the hair and color around the

face, use the movements first described on the temples also, down to the ears, and half way down on the forehead. You will find that this makes the eyebrows take on several darker shades of color, if they are not already black.

This treatment makes a very perceptible improvement in the hair within a few months, both as to color and quantity.

For the encouragement of those whose hair has not yet commenced to lose its color, and who would prevent this change, I will say that since this article was written I have been informed of a lady who for some reason habitually slept on a bed elevated eight or ten inches at the foot, and though when my informant knew her she was long past the age when this change usually takes place, her hair still retained the full brown color it had in her youth.

In studying the hair the elusive behavior of the pigment is both interesting and tantalizing. It seems to be the general impression

that there is no circulation in the shaft of the hair. This may be because the subject has not been considered of sufficient importance to demand any serious study. But in order to corroborate some personal observations the writer inquired of Dr. Vail whether in the case before quoted, the hair had grown out black from the roots, or had changed color evenly throughout its length. He replied very explicitly, "The hair did not grow out black from the roots, but the hair became black after it had already grown out white. I never heard of another similar case, and had this man been past seventy or seventy-five, I presume the change would not have occurred, or at least it would not have been so pronounced. He was about sixty-five years old."

These cases prove conclusively that there is a circulation of some kind throughout the length of the hair, for there must have been some fluid to carry the pigment there, and it must have taken place practically all at once

in the whole strand. This is the way it loses its color also, single strands failing to get the necessary pigment become white throughout their length.

It is remarkable how rarely a hair is found that is not uniform in color from end to end, and this rarity indicates the speed with which the change is accomplished. When they are caught in the act of changing, the coloring seems just as apt to be at one end as the other, and it is invariably of the full tint of the natural hair, with the other part of the strand entirely white. That is, in turning white there seems to be no *diluting* of the color either in whole strands or parts of them, though of course there are different shades of color frequently to be seen on different parts of the head at any age.

The formation of blood seems to have been studied mainly in connection with hemorrhages. Dr. Howell's Physiology referred to above contains the following:

"If a hemorrhage has not been fatal, ex-

periments on lower animals show that the plasma of the blood is regenerated with some rapidity, the blood regaining its normal volume within a few hours in slight hemorrhages, and in from 24 to 48 hours if the loss of blood has been severe; but the number of red corpuscles and the hemoglobin are restored more slowly, getting back to normal only after a number of days, or several weeks."

Kimber & Gray's Physiology has the paragraph below:

"Regeneration of the Blood after Hemorrhages,—A large portion of the total amount of the blood in the body may be lost suddenly by hemorrhage without producing a fatal result. It is probable that a healthy individual may recover from the loss of as much as three per cent of the body weight, provided the lost blood is at once replaced by a solution having the same degree of concentration (i. e., isotonic) and containing one or more of the important salts of the blood.

Physiological saline solution, i. e., sodium chloride, 0.7 to 0.9 per cent fulfills these conditions, and is usually introduced directly into a vein. This operation is called *intravenous infusion*, and the benefits derived from it are:—

(1) The heartbeat is increased because it must make stronger contractions to propel the extra fluid.

(2) The volume of the circulating fluid is sufficiently increased to maintain normal conditions of pressure and velocity.

(3) The red cells are kept in rapid circulation and thus loss of oxygen to the tissues is prevented.

(4) The tissue cells are provided with water and thus protected from the bad effects that would follow the withdrawal of water.

Plasma is regenerated with some rapidity (probably within a few hours) but it will take some days or even weeks before the number of red cells and the quantity of haemoglobin is replaced."

These questions are interesting when speculating as to how long it may be before some results should be perceptible when the theories presented here are put to the test.

The brain, said to be the co-ordinating organ of the body, should have time to rehabilitate itself before it could be expected to increase the volume of blood. Unless indeed the presence of the unusual amount of blood secured to the brain by gravitation acts in itself as an auto-suggestion to the subconscious mind and through its direction a proportionate increase of blood is provided more promptly for the rest of the body.

The theory briefly restated is this. The action of gravity exercised through a number of years in both retarding the upward flow of blood to the head and in withdrawing it before it has completed its work, gradually reduces the vitality of the brain and other organs located there, through lessening their supply of food and oxygen.

The hair, eyes, teeth, and hearing exhibit

their imperfections directly to the senses, while the undernourished brain is reflected in the loss of mental power and also in the smaller supply of blood formed in the body as a whole.

The smaller amount of blood results in a reduction of cell activity and of vitality in all the different organs and parts of the body and accounts for the loss of muscular fullness and body heat, as well as for the thinness of the walls of the blood vessels, while the diminished flow and vitality in the blood itself and the lymph is the cause of its leaving behind it the dead cells and mineral deposits found in the various tissues.

The individual organs being two-thirds of the time in the same position with respect to gravity, must share the same inequality of blood supply in their upper and lower parts that the body has. Consequently their vitality must be further impaired on this account.

Gout, being an affection of the lower ex-

tremities, according to this theory should be caused by an opposite condition to that existing in the head, namely, by an excess of blood. That this is true is indicated by the fact that physicians have always recognized it as a disease resulting from too much or too rich food.

The long climb against gravity which the blood has in removing the waste products from the feet is probably the reason why nature helps it out with this duty by causing the feet to perspire more freely than the other parts.

A study of the relative length of life of different types of animals might be of service in the effort to learn just how much effect gravity has on length of life through its influence on the brain alone. For instance, certain animals, as the elephant, rhinoceros, bear and hog, carry their heads nearly on a level with their hearts, while others, as the giraffe, deer and antelope, hold their heads high except when feeding from the ground

or low shrubs, which all these do naturally, except the giraffe. As considerable time is spent in feeding and nibbling, the giraffe is the only one of this class offering a fair comparison with man in the effect of gravity on the brain. Owing to the rarity of this animal, its natural longevity is probably not known, but the fact that it is disappearing from its native haunts indicates that it is short-lived.

An artificial test might be made with two herds of antelopes, one of which was fed from the ground and the other from a high level so that they would have to reach up in feeding. And as the object is to keep them in this position as long as possible the food should be given in small quantities at a time.

According to the theory those fed from the ground should live longer than those reaching up for food. And as deer live only about 20 years, this would probably be the quickest way to test the question on animals.

The other type, those that balance their hearts with their heads (a good thing to do,

by the way), includes the elephant, the longest lived of all creatures inhabiting the earth and attaining sometimes the honorable age of 200 years. Swan belong to the class in which the blood has to rise considerably to reach the brain, and yet they are credited with living 100 years. But who knows how many of those years are due to the large amount of time they spend with their pretty heads in the bottom of the lake digging for roots, etc.? Some years may also be attributed to their tranquil and harmonious surroundings, which produce peace of mind and a healthy brain. Their cousins, the geese, are said to live only fifty years. This disparity may be partly due to temperamental differences between the two birds. Though we cannot hold the goose responsible when confined in a farmyard with a constant threat in the air of either a plucking or the pot, we must acknowledge (to our own shame, perhaps) that the temper of the irascible goose in no way resembles that of the serene swan.

And the emotions are known to have their own effect on the brain.

In official reports "old age" is sometimes given as the cause of the death of persons still in the thirties. This is done when the attending physician had been unable to find any cause for the effects which resemble old age. Could they not be due to an imperfect functioning of the Medulla Oblongata resulting from some invisible cause, such as partial obstruction of the circulation to that organ? Or this effect might be produced naturally in middle life if the person had unusually small arteries leading to the brain.

That there is a natural variation in the size of arteries is suggested by the different complexions we see, some being florid and others pale. And when all the external organs vary so greatly in different persons, the natural supposition is that the internal ones do the same. Such characteristics are inherited in some instances, and individual in others; consequently, a difference in the size

of the arteries supplying the brain, especially the Medulla Oblongata, may be the explanation of why some families as well as some individuals are longer-lived than others. And there are certain conditions which would make these arteries abnormally small in a perfectly natural way.

Probably, however, the greater number of these youthful "old age" cases are the victims of the habit before referred to, of taking an insufficient quantity of water, especially with their meals, to form a normal supply of blood, and thus bring upon themselves unconsciously and prematurely the conditions of old age.

Among animals we see that horses, dogs, and cats wallow frequently, thereby exercising their internal organs; and all fowls turn their eggs over every day.

We know that it is not good for our bodies to lie all night on one side, yet make no effort to offset the bad effects of the upright posture we maintain 16 hours out of the 24.

The recommendation that we sleep gener-

ally on inclined beds with the head slightly downward may seem at first sight to advocate the further turning topsy-turvy of an already disordered world. This, however, is not the object sought, but rather what may be described as a backward swing of the pendulum in human physiology to be accomplished at night, during our sleep, in order to counterbalance the forward movement of the day; and ultimately to result in keeping the race on its feet a greater length of time, and in better condition during that time.

It is simply such an adjustment of the material body of man to a great law of his material environment, as will cause that law to contribute to, rather than retard, the higher development of the whole man.

In other words, it causes the Law of Gravitation to work in harmony with the Law of Evolution for man's advancement in all lines. Even for the higher mental development it is necessary for the material part of us to make its bow to Mother Earth.

If the position raises any uncomfortable suggestions of our prehensile progenitors (if such there were), we may recall the fact that at least it did not prevent them from developing into a higher race of beings. This is something that the human race has repeatedly failed in so far, after successive advances to a high point of civilization.

It should be considered too that as this is now the normal prenatal position of the race, great advantage would be had in starting the practice of sleeping in this posture from the very beginning; first, because the child would experience less change on its advent into the world; second, the heart and brain would not have to adapt themselves anew to the position later in life; third, we would get the benefits of the practice through the full course of life, instead of just a part of it.

If by this means the same proportion of blood may be retained in the body as exists in childhoood or even the first years of adult life, what a joyous race we may become! For

as the aphorism says, "The Blood is the Life," and its preponderance in youth is doubtless the cause of the abundance of "animal spirits" during that period.

Nor would the joys of youth be the only advantage to be gained by a return to young bodies. Life manifests itself in proportion to the amount of cellular activity taking place in the body, and this depends directly on the supply of blood, since this fluid must carry all the material for that activity. The body is much more speedily renewed in childhood than in later life, as the relative time it takes to heal a wound will prove.

This was illustrated in quite an astonishing way recently before the writer's eyes. A little baby, about a year old, had been put to sleep in his carriage out on the lawn one summer evening, and left there until after dark. When his mother rolled the carriage into the house, we were both startled to see a large drop of blood on one cheek—much too large for a mosquito to have made. She

soaked it up, and with a wet cloth tried to remove its traces. But underneath was a deep scratch about a quarter of an inch long, which of course could not be removed. How it came there remained a mystery, but the most astonishing part of the occurrence was the fact that the next morning not the slightest trace could be found on the downy cheek of the scratch that was made there the evening before. We each looked at the other incredulously, to make sure we had not dreamed it was there.

It is needless to say that such a speedy change as this could not have taken place in the flesh of an elderly person, nor of an adult one.

So it is evident that the statement previously quoted from Dr. Armitage that "one-third of the human body is composed of live cells, and two-thirds of it of dead cells," refers to a person past the youthful stage of life, or these dead cells would have been car-

ried off in the more abundant flow of blood during that period.

So the younger the body, the fuller the amount of life, and the more speedily the life processes are accomplished. This abundant physical life existing in the child brain seems to make that organ more susceptible to certain mental powers than it is in later life. Memory and receptivity to new ideas are two of these. The most enduring memories are impressed on the most fleeting brains. A connection between life and mind is made here whose durability seems to be measured by the amount of life in the physical organism at the time it is made, and must depend on the fullness of the impression made when all the capillaries are filled to their capacity with blood.

In the matter of receptivity to new ideas, it seems only natural that the young should possess this power in a greater degree than older persons, because their brain matter is in a more impressionable state, and every new

concept must make its own change in the brain.

If these youthful capacities of the brain can be retained throughout life, who can foretell the Future?

Who can estimate now the limiting effects on the human mind caused by a reduced blood supply to the brain during all the later years of life through the action of gravity, both directly and indirectly?

Does it not seem to be the law of Gravity, rather than Father Time, that lays its withering hand on the head of man and says to him "Thus far shalt thou go, and no further"?

In discussing this subject with a lady who is an M. A. of the University of Helingsfors, and the wife of a distinguished scientist belonging to that institution, she stated that she had seen a good illustration of the efficacy of simply reversing the action of gravity in improving the mental powers. One of her companion students, a girl of about 20 years, used to find it difficult at times to impress

upon her memory her studies for the next day. On these occasions she would lay aside her books, and lying across a bed for a while, would hang her head over the side until her brain became refreshed, and would then arise and proceed successfully with her memorizing.

There seems to be, therefore, good reason to believe that this treatment may be helpful in many cases of the mentally deficient, both young and old.

The well known difficulty which a new idea has in establishing itself is thus seen to have a physical cause besides the mental and sometimes moral one also. While it is doubtless true that "there are none so blind as those who will not see," since this implies a personal objection to some foreseen results of the new idea, it is also true that many a new proposition is opposed simply because the brain matter of its opponents has become set and hardened in the form given it by the opposite conception. And at the usual period of life in which this attitude of mind is expressed the

brain substance is poorly irrigated, and it is hard to make the necessary new adjustments in it. Hence when the elderly distinguished scientist turns aside from a new idea, or even actively opposes it *without being able to justify his position*, he is simply following all unconsciously the path of least resistance for himself. His resistance to the new arises not from his knowledge of incompatible truth, but from an unyielding brain substance too firmly built up in the opposite conception to admit of change with the limited amount of blood at its command. The difficulty in establishing a physical foothold in the brain of some recognized leaders of thought, together with the sheep-like tendency of most humans to follow a leader, even if they do get led astray, is the reason why new ideas have so often had to go through a long period of growth before they could be of general use.

In such cases the impression of the new idea has to be made on the brain by continued repetition until it cuts its own groove or

creates its own cell aggregation. The time it takes to do this reveals the state of the individual's brain substance. Those persons in whom the power of the imagination has been cultivated have greatly the advantage over those in whom it has been suppressed. The great variety of ideas introduced by the imagination keeps the brain cells in a more mobile, impressionable state, hence they can more easily adjust themselves to the requirements of a new idea.

So Dr. Walter Graves in "A Plea for the Open Mind" published in the April, 1922, number of *American Medicine*, says, "Profound learning, great achievements in the application of well-established principles, improvements and refinements in technic, do not at all fit a man for a career as a discoverer. Indeed, it may well be questioned whether trying and time-consuming teaching and administrative work do not actually tend to unfit one for discovery, and warp one's ability to see the new. . . .

"Let it not be thought that these conservatives are without value to the medical profession aside from their work in teaching and administration. Far from it. They have often stood like a rock against hurtful fads and fallacies; but they have also stood as shown above, against new things which have triumphed in spite of their determined opposition, and proved of the greatest value to the human race. In medicine there is no final authority but the fact. The fact will not be persistently ignored. The theory which undertakes to ignore the fact must be discarded or so modified as to recognize the fact. The fact triumphs, in the end, over all opposition."

The accomplishments mentioned at the beginning of this quotation are not those of a young man, as to acquire them necessitates both time and an unusual amount of mental work, both of which are aging factors; so we must consider these conclusions as applying to elderly persons only. His observation

that teaching and administrative work tend to warp one's ability to see the new, well illustrates the effect of the constant repetition of the same ideas on the mind and brain substance. These ideas have to be much more deeply impressed upon, and firmly held in the mind of a teacher, than in that of any student, to make a success of teaching. And then this routine has to be repeated with every new class, each time strengthening the impression on the teacher's own mind and brain. It is not surprising then that they, unless they have kept their minds open with original studies of their own along these lines, should be the last to change their opinions.

This exemplifies also the truth of the statement of William Kearney Carr in his wonderful little book, "Matter and Some of its Dimensions," that "strange as it may appear, the scientist will probably be the last to divorce himself from the old preconceived opinion. There are, of course,

many brilliant exceptions to this rule; but of all the attributes of the human mind, those which characterize the average orthodox scientist—the man who sees the world only through the medium of the microscope, the polariscope, the telescope, or the spectroscope—are the least attractive. In him more than all others, is reflected the truth of the proposition that the degree of receptivity of men's minds to new facts is the only invariable thing we know. With him, scientific dogmas merit the same superstitious reverence as the gods of old; with him, what opposes classical teaching is wholly intolerable."

Evidently this is not the description of a man who does his own original thinking, and these are the ones who constitute the brilliant exceptions referred to. These have kept their minds open by a first hand study of nature and life, untrammeled by man-made dogmas, which set up both mental and physical barricades; so they, when a new proposition is

presented to them, are able to examine it on it merits, regardless of how it fits in with previous opinions.

It must be evident to everyone that recognition of the fact that it is often a physical cause which prevents elderly people from accepting a newly discovered truth and also prevents a change of opinion in younger ones when their ideas on a subject have been deeply impressed upon them (as is generally the case with distinctive religious doctrines, scientific dogmas, and national or local prejudices), will cause other people to have more leniency and toleration for the tenacity with which they maintain their mental attitude, and not ascribe it so hastily to either obstinacy, ill-will, bigotry or stupidity.

They will recognize the fact that these closely held opinions are truly a part of their owner's bodies, and also that if they themselves had been subjected to the same mental and environmental influences, they would,

in a hundred cases to one, be of the same opinion.

A consideration of these facts will contribute toward more peace and harmony in all human relations.

The venerable Louis Cornaro, through a strict observance of all the laws of nature that he was acquainted with, succeeded marvellously well in preserving all his physical senses and mental powers to the last. Indeed when one reads his four discourses on the subject of right living, the suspicion arises that he was probably indebted to the unconscious use of certain mental and spiritual laws, as well as to the conscious use of natural ones, for his remarkable success.

The law of gravity seems to have been the only one that brought him to earth. And as he was contemporary with Christopher Columbus, and therefore lived nearly 200 years before Sir Isaac Newton discovered the law of gravitation, he may be more easily excused for not observing it than we who

have lived in the 200 years since Newton's time.

We have studied this law from many angles. Great things have been done with it and in spite of it, but the point where it touches most vitally human life, health and happiness has been completely overlooked.

Though there are no inclined beds on the market at present, anyone may easily try the experiment of using one by propping up the foot of an ordinary bed.

Some people may have the idea that if they have a high blood pressure there may be danger of getting too much pressure on the brain if they sleep with the head lower than the rest of the body. But unless there is some abnormal conditon there seems to be no occasion for apprehension on this account. In the first place, there is of course an outlet as well as an inlet to the brain. Then a high blood pressure in other parts of the body is one of nature's regular methods of forcing blood to the brain when it is needed there.

There is always more or less room for expansion of the brain provided in the cushion of cerebro-spinal fluid which surrounds it. Nature has a way to quickly increase or decrease this fluid according to the space it has to fill, and it is stated that it increases with age after puberty, as the brain shrinks. Furthermore the brain is said to shrink during sleep, as other organs do during their periods of inactivity. These different facts seem to render highly improbable, if not impossible, any overcharging of the brain with blood by gravitation under normal conditions. And then if the practice is commenced early enough there may be no high blood pressure.

This is now generally considered a disease, and various methods are employed to bring it down. It is thought by some to be due to toxins contained in the blood which irritate the walls of the blood vessels, causing them to contract. And this in consequence is supposed to put an extra amount of work on the

heart in forcing the blood through these contracted arteries.

This supposition, however, is based on the other one, that there is the same volume of blood to be sent through the body when the pressure is high as when it is low. But if the contracted arteries are nature's adjustment to a reduced amount of blood there is evidently no additional labor put upon the heart, but it is rather decreased. May not the weakened conditon of the heart and other organs, which is said to frequently accompany high pressure, and also the toxins found in the blood, result from the failure of the reduced volume to furnish sufficient nourishment to the organs, and to carry off fully the waste matter?

And is there any reason to think that the toxins are not the same as the fatigue toxins caused by cellular disintegration in muscular tissue during exercise, and left there until a fresh supply of blood carries them off?

For what is it to be fatigued, but to have used up your surplus blood supply, and what

is resting, but waiting for a new supply to form? Can we not see this in the haggard looks of the "worn out," whether by physical, mental or emotional stress, and is not the new supply clearly visible in the refreshed looks, bright eyes and rosy cheeks of the rested?

Experiments on organs removed from the body have led to the conviction that if they are properly supplied with nourishment, *and the waste matter removed*, they will live indefinitely.

The following interesting description of one of these experiments is taken from Dr. Armitage's book, "How to Stay Young."

"The Heart has been Made to Beat. Parts of a chicken heart were placed on slides, and fed with warm blood. In a little while these parts began to build more tissue of their kind, and after a time they began to expand like whole hearts in living bodies. One part was purposely made smaller than the other, and the smaller beat and pulsated regularly and with greater speed than the larger part, the

smaller having 120 and the larger 92 pulsations to the minute. This proves that the heart beats of its own power, independent of any assistance from the rest of the body, and that its energy and vigor are so great that it takes a lot of abuse to stop it.

"After the above experiment with the chicken heart was continued for three days the tissue of the smaller part dropped in its rate of action to 90 heartbeats a minute, while the larger part fell to 40. On examination it was found that as the new tissue formed some of the old died and made a poison known as toxin. When this poison was removed by washing and new blood supplied for food, the heart again became vigorous and commenced to pulsate at a furious rate. *While beating the size was increasing*, and finally, the two parts grew together and became a whole organ; the two parts which had been beating at different rates of speed assumed a modified rate when

they came together and pulsated as one heart. . . .

"Experiments have proven that the parts that are taken from very young life start to grown soon, those from middle life later, while those from old life require a long time."

This would seem to be a natural result caused by the different proportions of live and dead cells in the parts.

The pains in the feet and joints of elderly people are probably caused by an excess of this cellular waste matter, since it must accumulate in the parts most used; and this explains why soaking the feet in hot water, and applying heat to the joints is the most effective way of relieving the pains, since it opens the pores of the skin and allows a great deal of the waste matter to escape through the perspiration vents besides that carried off by the additional blood drawn to the locality. These vents must be greatly obstructed by the dryness of the skin in old age, another result of the reduced blood volume.

In Bright's disease, which is said to be invariably accompanied by high blood pressure, there are also a number of other symptoms which would indicate a reduced amount of blood. These are anemia, emaciation, dry and wrinkled skin, and dropsy,—the last being caused by the failure of the lymphatics to take up as usual the fluid exuding from the capillaries and return it to the veins.

Dr. Howell's Physiology states that "It has long been known that when blood pressure in the arteries falls, the pulse rate increases and when it rises the pulse rate decreases." If we may reverse the order of these two processes as given here, or consider them as taking place simultaneously, since both are controlled by the Medulla, we can see a reason for the higher blood-pressure. The slower heart beat means a diminished supply of blood, or that a smaller amount is *being formed*; consequently the arteries have to contract to fit the reduced volume, and force

it through the capillaries, and also send the necessary amount to the head.

Tigerstedt says, "Since oxygen is consumed in large quantities in the tissues, it is evidently of great importance that the blood should not flow too slowly through the capillaries. The high pressure which prevails in the arteries *is necessary in order to keep the blood flowing through the capillaries with sufficient speed*. . . . The capillaries are unquestionably the most important part of the vascular system."

This understanding of the service of high blood pressure in nature's order accords with what are said to be its normal variations through life; that is, to increase rapidly up to maturity, and more slowly from maturity to old age. Through the growing period the pressure has to be adjusted to the combined effects of the ever increasing height of the individual and the ever decreasing volume of blood, while after the growth is attained, only the latter consideration would exercise a

constant influence on it. Thus it would seem to be a necessary provision of nature to keep up the normal circulation throughout the body.

Since a high pressure indicates a small volume of blood, it would seem that the only justifiable way to try to reduce it would be by increasing the blood supply. And that is what needs to be done to counteract the other symptoms of age. Not by transfusion, however, as that of course could give only a temporary relief, lasting until the injected blood was used up; and besides, this is manifestly unjust to some other life. The body must be self-sustaining. But the immediate improvement following transfusion shows what the need is.

Doubtless the best way to increase the amount of blood is to remove the cause of its decrease. And as this seems to be an anemic Medulla, some method should be used to compensate this organ for the blood it is deprived of by gravity.

Hardening of the arteries may be more the result of contraction than of the mineral deposits, as this too must be a progressive process, in adjustment to the decreasing blood. Hence the much-quoted expression, "A man is as old as his arteries," may also be used with this understanding of the cause of their hardening and of high blood-pressure, since these indicate the proportion of blood still existing in the system, and this is the measure of old age. The flesh of the old Indian who recently died in Minnesota at the reputed age of 137 years, was said to have become so hard and dry that it seemed almost petrified.

It seems likely that the permanently contracted state of the blood vessels in old age must cause them to be less permeable, and in this way produce a retarding effect on cellular activity in addition to the decreased amount of blood. In this connection it is interesting to note that Gray's Anatomy (1918) states that "the diameters of the

capillaries vary in the different tissues of the body, the usual size being about 8 micromillimeters. The smallest are those of the brain and the mucous membrane of the intestines; and the largest those of the skin and the marrow of bone, where they are stated to be as large as 20 micromillimeters in diameter." Probably their size also may be reduced by old age conditions, either contraction or clogging, and this would raise the question as to whether it would then be possible for the blood corpuscles to get through them. The red cells are said to vary slightly in size even in the same drop of blood, but to have an average diameter of about 7.5 and a thickness of about 2 micromillimeters. So they normally have to go through in single file so far as width is concerned, but might be two deep. The white cells, however, are larger than these, the majority measuring about 10 micromillimeters in diameter according to Gray's Anatomy, and this is ¼ larger

than the usual diameter of the capillaries as given above.

It is evident that under these conditions they could not enter the majority of the capillaries at all in their normal round shape, but must be obliged to avail themselves of the power *some* of them are said to possess of changing their form in order to get through. The Anatomy quoted states that "If the web of a living frog's foot be spread out and examined under the microscope the blood is seen to flow in a continuous stream through the vessels, and the corpuscles show no tendency to adhere to each other or to the wall of the vessel. Doubtless the same is the case in the human body; but when human blood is drawn and examined on a slide without reagents, the corpuscles tend to collect into heaps like rouleaux of coins."

If it may be correctly inferred from the latter part of this quotation, that in the human body the passage of blood through the capillaries has not been studied under the

microscope, there must be a large and fruitful field for exploration here, since it is only in human blood that the great majority of white cells are larger than the red ones, and also ¼ larger than the usual diameter of the capillaries. It would seem that this alone would be sufficient to clog the capillaries, especially in the brain and mucuos membrane of the intestines, where they are smallest. And the fact that hair continues to grow after losing its color may be accounted for if, through contraction or clogging of the capillaries, the pigment-bearing cells are unable to reach the hair follicles.

After this article was completed to this point and sent to the publisher, the writer received from Dodd, Mead & Company, Sanford Bennett's book called "Old Age: Its Cause and Prevention." The similarity of this title to that at the head of this article aroused an interest which deepened on studying the methods he used to bring about such felicitous results as the complete rejuvenation

at 72 years of age of a human body that was old, worn and sick at 50 years.

It was at the latter age that he collapsed, and during a month of enforced rest decided to turn over a new leaf. He commenced taking muscular exercises every morning *while lying in bed*, the reclining position probably appealing to him because he was too weak to take them standing, though he calls them "a lazy man's exercises." At 60 years of age he found that he was certainly growing younger, his body and limbs had already assumed the appearance of youth, though there was a marked contrast in the muscles of his face, neck and throat, which up to this time he had neglected to exercise, and they were consequently still as old looking as at 50 years. He then took up these and in two years' time they were so much improved that he presented the entire appearance, together with the elasticity of a man about half his age; and this condition continued, and is vouched for by reports of a physician, until

he was 72 years old, at which time he wrote this book.

The physician reports in 1906, eleven years after his first examination, that "At this date I find a great change in the condition of the muscles, organs, skin, hair and general health of the subject, who really seems to be rejuvenated. . . . There is a remarkable preservation of tissue integrity and functional activity; the subject has now entered his 66th year and has all the elasticity and appearance of a young man," and concludes this report with the statement that "The success which Mr. Bennett has obtained would seem to be a practical verification of the truth of his theory, 'that the secret of health, longevity, and elasticity of the body lies solely in the elimination of dead and worn-out cellular tissue, which if allowed to remain in the system would impede the functions and shorten life; and that the only method by which this dead cellular matter can be eliminated is by muscular activity.'"

In speaking of his exercises Mr. Bennett says, "This is a certain means of throwing off dead matter which, as I have repeatedly stated, is the principal cause of old age. In my case rheumatism, dyspepsia and other minor ailments have departed long ago, and at 72 there is no longer any evidence of physical deterioration.

"But in considering the causes of old age there is also another and a very important factor to be taken into consideration and that is the condition of the glandular function. In old age there is usually inactivity in this direction, defective assimilation being therefore a marked characteristic of advanced years. With that condition there is a loss of flesh and while it exists, it is impossible to build up the body. The remedy lies in general muscular acivity. This, if practiced with all of the muscles of the body, will mechanically stimulate all glandular action, and whether that function is of the nature of secretion or excretion, greater

activity will follow and the result will be improved assimilation, and as that function is the basis of life, it is evident that health will be therefore improved. This is all very simple and logical when it is explained, but the fact that the secret of glandular action lay in the mechanical process of adjacent muscular activity was, for a long time, a difficult crux to me. Naturally, you think that I could find the explanation in any work upon health methods or physiology, but you are mistaken. At least, no special significance seems to have been attached to this vitally important fact. Reliable books clearly describing proven methods of deferring old age are very scarce, and I have usually been compelled to solve the problems myself, for I have been prospecting a route to health and longevity, seemingly little considered and never travelled to any considerable extent by any one."

Mr. Bennett seemed to recognize that the cellular and mineral deposits are to be

found in all the tissues of the body, and not simply on the walls of the arteries, as seems to be the more general impression; and his regaining the elasticity and functional activity of youth through the practice of certain exercises convinced him that his success was owing to these deposits being "worked off" in this manner.

So far as the arteries are concerned, it is a significant fact however, that the first report made by the physician in 1895 shows that he had "symptoms of arteriosclerosis slightly developed," the second one, made in 1906, does not mention this trouble, while the last one, made in 1912, states that, "Aside from a very slight degree of arteriosclerosis I do not find any of the senile changes naturally to be expected at the age of 72, that being the present age of the subject." There seems therefore to have been less change made in these deposits than in any other feature of his rejuvenation, unless they disappeared before 1906 and returned gain by 1912.

These, however, and the lack of color in a luxuriant head of hair were the only signs of age that were discoverable on a rigid physical examination in 1912.

Such a remarkable combination of physical youth and advanced years having never been attained but once before, it is worth while to inquire into the differences between his method of exercising and those usually practiced, which have no such happy effect; and also into those of Ninon de L'Enclos, the French beauty who never grew old though she lived to be 91 years of age, and who was the other *young old* person referred to. Mr. Bennett refers to her several times as the originator of the methods of facial, throat and neck development he practiced and found so successful.

The first new feature is of course the fact tha he practiced in bed. His reason for this is that it is more comfortable and better suited to old people. Those, however, who have read the preceding part of this article

will note at once that the reclining position also puts an end to the retarding influence of gravity on the flow of blood to the head; and that any bodily exercises stirring up the general circulation while in this position, especially in the shoulders and arms, would have the same effect of sending a larger amount of blood to the head than usually goes in that direction. This naturally would improve the condition of the brain and other organs located in the head, and according to the theory that the total amount of blood in the body is regulated by the Medulla Oblongata, that organ should respond by increasing it. And Mr. Bennett did find in ten years (that seems a long time, but he lost some years experimenting) that he was "actually growing younger." Then he added the face, throat and neck exercises, which in two years completely rejuvenated those parts. He remarks that "this development of the throat and of the entire neck has been accomplished with much less exertion and in

less time than was required to develop the arms and legs. The most probable reason is, that the throat and face muscles, having never been exercised to any extent, were consequently much atrophied; and this improvement when they were systematically exercised, was more noticeable."

Of course these throat and neck exercises, of which there are quite a number, greatly increased the flow of blood to the brain, and there are also several shoulder exercises he used which would have the same effect, sending the blood through the Vertebral Arteries directly to the Medulla Oblongata. These doubtless greatly rejuvenated that organ, which in turn sent its blessing to the whole body in the form of a fuller supply of blood.

This would account for the more speedy rejuvenation of the face and neck than of the legs and arms. While Mr. Bennett was convinced that his rejuvenation was simply the result of "working off" the cellular and mineral deposits, according to the testimony

of the medical profession exercise "works on" these deposits instead of working them off, that is, to quote one of these authorities, "arteriosclerosis is the result of long-continued wear and tear. Everyone acquires his arteriosclerosis within the circuit which he has most taxed. It winds up the best brains in the community. . . . The brain, heart and kidneys show greatest changes in those of sedentary habits—i. e., in brainworkers. In workingmen, the arteries of the extremities are most involved, in wives of farmers the arteries of the legs are the seat of degeneration."

All of which clearly indicates that these deposits are merely the ashes left from cellular activity which the diminished blood currents of old age are insufficent to carry off.

Mr. Bennett was for many years previous to his collapse Treasurer of two large organizations, so during most of his waking hours was using his brain, and most likely in a standing position a good part of the time. Under these circumstances, his mental activ-

ity was calling the blood to his cerebrum while gravity had a straight pull in the other direction, causing no doubt his varicose veins, as well as an undernourished Medulla which resulted in "old age," or a reduced blood supply to the whole body. He probably had also much more arteriosclerosis in the cerebrum than at other places which were accessible to the examining physician, and which had not been so much exercised.

The method of stimulating an organ by exercising an adjacent muscle he speaks of in connection with the glands, saying that for a long time it was a difficult crux to him. This seems to have been because he regarded the change as one accomplished entirely by forcing out the dead material by means of muscular contractions and relaxations, and this method could not be used on glands since they have no muscles to contract.

The fact that the glands and adjacent muscles are fed generally by the same arteries accounts for the fact that both are improved

by exercising the muscle, and also establishes the other fact that *it is the increased flow of blood building up the new tissue and also carrying off the dead material, rather than the process of working this off by exercise, that brings about the rejuvenation.* The ordinary exercises taken in the upright posture have never had the effect of rejuvenating any one.

Mr. Bennett's photographs, and his physician's statement that he was both inwardly and outwardly renewed, prove that he had experienced a considerable increase of blood; otherwise, there would not have been sufficient to put the whole body in this condition at his age. To place the question beyond a doubt, it is suggested that some successful ones among his many followers be induced to submit to the blood measuring test, and compare the result with that of any other person of the same years and height, who also exhibits the average development of old age imperfections for those years. For it is evident that there is much variation in this, and that

it results naturally from a different proportion of blood even in persons of the same age.

The common expressions of "full-blooded" and "thin-blooded" applied to different persons bear testimony to this, as well as do the various bodily conditions such persons exhibit.

It would make a valuable contribution to health literature if all of the people who have given Sanford Bennett's exercises a fair trial would write up their experience so that all could be published together for the benefit of others.

One of these, Col. P. R. Smith, published his experience in a magazine article in 1921. He was then 87 years old, and up to two years previously had been subject to many trials of the flesh in the form of different diseases. At this time, he says, "By accident I got hold of a copy of Sanford Bennett's "Old Age, Its Cause and Prevention." I was pretty weak, and his 'lazy man's exercises' taken comfortably in a good warm bed, appealed to me. I learned all about the

claims of physical culture. Talk about eye openers! The scales began to fall from my eyes quick and plenty! It is a wonderful work and if studied and practised as it deserves will revolutionize man's treatment and care of his own body. . . . When I commenced the exercises two years ago I had what the doctors call slight curvature of the spine. I walked rather bent over and could not lean far forward or stoop over without falling flat, unless I held to something. Today I can bend over, touch my feet with my hands, and rise erect without any kind of support. My spine is as straight as ever and I walk as erectly as I did as a trained solider fifty years ago. . . . For forty years I suffered with torpid, or inactive liver, and took enough liver medicine to stock a small drug shop. . . . I have not taken a dose of medicine in three years, because I find a drugless remedy for nearly all my ailments. I have suffered so much from my many illnesses, and mentally from the untimely loss

of so many of my loved ones, that I have often craved death—especially since old age seemed to be coming so hopelessly upon me. But not being a quitter, I interested myself in the experiment of trying to make a young man out of an old wreck, and have succeeded far beyond my own expectations or the hopes of my family and friends.

"In many respects I feel as young and active as I did at fifty and I am told I look it. My mind is as clear and my mental conceptions as fertile as they ever were; I write and dictate rapidly and never have to wait a moment for a word to express my thoughts. In my travels (I still carry on my mining business, which necessitates long, hard trips into the real wilds) I frequently meet friends whom I have not seen for thirty or forty years or more. Invariably they recognize me at once, and usually exclaim, 'Why Colonel, you have not changed at all since I saw you last.'

"But the best of all is that I feel so well.

My liver, lungs, heart and kidneys are still performing the functions of a healthy man of fifty; my circulation and digestion are entirely satisfactory. . . . What I have done, you can do—and much more besides, if you so will. Why permit yourself to live half your life an invalid, when you can enjoy comparative comfort and at much less expense, live a happy, healthy and joyous life up to a good old age?"

The belief that the peculiar benefit of those exercises lies in the fact of their being taken in the horizontal position, is corroborated by the experience of another writer of a magazine article in which she described how she rejuvenated herself in three months. This lady was only forty years of age, but had been an invalid the greater part of her life, and was now worn out besides by her duties as a minister's wife and the mother of five children.

After trying many different suggestions and all the usual methods for health restora-

tion, she decided that she must work out her own physical salvation if she was to have any. She did this with a system of deep breathing, body friction, exercises and cold baths. There are sixteen exercises illustrated, of which twelve are taken on the floor. These twelve, and also another, in which she stood and bent over and spread her hands on the floor, all had the effect of sending an unusual proportion of blood to the head. But it should be noted that not one of her exercises was identical with any one of Sanford Bennett's. Nearly all of them were entirely different, and yet they had the same rejuvenating effect. She says, "If I become unusually tired during the day, I take a few exercises on the floor, and relax for ten minutes, and find it a great renewer. After I had followed this program for three months, I was entirely free from the old symptoms, no more pain in stomach or back, constipation and headache gone.

"Now after nine months of regular exer-

cise, diet, breathing and bathing, I am indeed a new woman, with better nerves, more energy, and constant improvement taking the place of constant retrogression.

"The past winter is the first in my life that I have worn summer-weight underwear, and also the first winter that I have not had a single cold.

"My memory is improving, all my senses are more keen than ever before. I have new aspirations and new hopes. I have found out how to keep fit, and face the future with the eager enthusiasm of a girl in her teens.

"Indeed, I sometimes think that I shall be allowed to live those thrilling years of life from ten to twenty, with my children, and make up in some degree that which I did not get during my own teens, because of the handicaps of a sluggish and painful bodily condition."

This certainly sounds as if she had acquired a new supply of young blood.

In marked contrast to the effect on the

brain of this exercise in the horizontal posture, is that of the kind usually taken in the standing position, which has a tendency to shake and jolt the blood from the head.

The motor area of the brain lies directly under the bald spot on the top of the head. Can we doubt that most cases of paralysis are caused by the same condition in the brain that causes the loss of hair from the scalp just above it—lack of blood? And can we be surprised that there is an insufficient supply of blood in these and every other part of the head (unless congested from some local cause), when we remember that the constant retarding and draining effect of gravity on the fluid blood there is intensified by the many jarring, jolting, vibrating motions the human body is subjected to during the day, such as train, street car and automobile riding, even when the more violent exercises are not practiced? Vibrations from street traffic have been given as the cause of the collapse of tall buildings of long standing. If they have so

much effect on brick and mortar how much more must they have on the mobile blood and delicately suspended organs in the human body?

The answer is pictured in the whitening and falling hair, the shrunken cheeks, the failing eyes and ears and decaying teeth of the later years of life, and finally by the collapse of the physical structure just as of the brick and mortar one.

The human race would be better off if many of our present physical culture exercises, as such, were abolished. The young do not need them, but should have instead open air games and plays in which they may exercise their muscles in nature's joyful, frolicking way as they feel inclined. These plays should be planned so as to avoid all excessive jolting of the body when in the upright posture, such as skipping rope, and include those which exercise the whole body when in a reclining or bending position, such as swimming, leapfrog, somersaults, etc.

It would be well to vary the games and exercises frequently, so that no one set of muscles would be exercised more than the others. If it is impossible to have this variety in one day different games could be used in a succession of days. Of course this would preclude any special training for proficiency in any game, as the object of the exercise should be to preserve the even development of the young body of the student rather than to expend his vital energy and endanger his health for the purpose of entertaining for an hour or so a crowd of thoughtless spectators.

Other new and important features of Mr. Bennett's exercises are that they were taken slowly and deliberately, so that the heart was not unduly accelerated; they were distributed evenly over the whole body so that all muscles were brought into play; and as all of his thirty exercises occupied only "a half hour or more" every morning, a very little time must have been given to each one. These features prevented any unbalancing of the system

through the excessive stimulation of any one set of muscles and the organs in their vicinity, and led to an even development of the whole body,—a condition which he says was always commented on by examining physicians.

In these particulars it will be seen that they differ radically from the usual college athletics, especially the competitive and spectacular ones, in which the heart is overstrained, and some muscles are over developed at the expense of others. It is easy to see that the normal circulation to the different vital organs and glands must be seriously interfered with by these violent and prolonged exertions of the same muscles and also that the chemical balance of the system may be upset in consequence.

Dr. Orrin McCrae Corwin testifies to the inefficiency of most college athletics to develop the whole body. He says, "The once great athlete is seldom a healthy man in after life. As a practicing physician, I have on my books at the present time four or five patients of

middle age, all of whom were in their time well-known athletes and all of whom are now suffering from well-defined organic disorders."

Physical exercise in the upright posture practiced by people past middle age for the purpose of regaining the muscular development of youth, when it accomplishes its purpose, probably does it at the expense of the more vital organs. That muscular exercise does not increase the amount of blood in the body, but simply diverts a larger share to the muscles, leaving the other parts minus that much, is indicated by the generally short lives of athletes, and also by the comparatively long lives and good health of many very thin people, the so-called "pine-knots."

Actual facts on this point obtained by reliable tests of the amount of blood before and after great muscular development would answer some highly important questions in the matter of physical culture.

The reason elderly people have to force themselves to exercise is because there is not

enough blood in them to furnish the necessary vitality to make it a joy to do so. When we have enough blood we "jump for joy," as in childhood. Consequently the main point for elderly people is to increase the blood. And as Mr. Bennett (and his followers) and Ninon de L'Enclos, the only persons who are positively known, the one to have regained, and the other to have retained, a young body in advanced years, both succeeded in doing this by means of exercises which sent the blood to the head, we may conclude that this is the effective way to exercise, if exercise we must. These throat, neck and face exercises, though taken up by Mr. Bennett only to complete the appearance of youth, and mentioned by him as of secondary importance, were probably the most vital of all his course. And they were the only ones mentioned as being practiced by Ninon, though he surmises that she must have used others also to have kept her whole body in such perfect condition. But if they succeeded in keeping her supplied

with a youthful proportion of blood she would no more need to "take exercises" than a child does. And it is possible that Mr. Bennet might just as well have left off the others after taking up these. It is also logical to expect the use of the inclined posture in sleeping to have the same effect that these exercises had in renewing and preserving youth, for this is only another way of sending blood to the head. And it sends it more evenly, in nature's proportions, through the different arteries, and without tax on one's energy, patience or will power.

The length of time it will be necessary to use this posture during the twenty-four hours to secure the greatest benefit, will probably vary with different individuals, and each one will be best able to judge for himself, after the novelty has worn off, just how much is needed by him.

But judging by the length of time spent in these exercises, and the results obtained, it seems probable that an hour or so a day may

be sufficient for most people, especially if massage is used with it. I have had two reports however, on the case of a gentleman 79 years of age, who after consulting his physician, and by his advice deciding to try this treatment, propped up the foot of his bed six or seven inches and slept throughout the night that way from the beginning.

After four weeks' trial, his physician very considerately wrote me of the experiment, and stated that the results had been very satisfactory to that time. Four months later I inquired about him, and was told that he was still using the positon and still was pleased with the results, one of which was the regular and natural relief of a somewhat constipated condition.

So how much to use this posture, and how much to exercise, are both matters for individual judgment.

Certainly one way or the other should be used by every adult, young and old, not only for the increase of blood which it promises,

but for its beneficial effects on the organs in the head. Thus the facial friction and deep massage used, no doubt produced the "small boy appetite," and excellent digestion which Mr. Bennett enjoyed, through reviving the salivary glands. And by the same exercises Ninon kept the blood circulating through the dental arteries so successfully that in extreme old age her teeth still looked like pearls. Her eyes, too, are said to have been as bright and sparkling as in youth.

The prospect seems a delightful alternative to the experience so many are being subjected to now in having whole sets of teeth extracted because they are ulcerated at the roots. Why do they ulcerate except for want of sufficient blood to keep them in a healthy conditon? And if it is possible to get the blood to them, why not do it, instead of having them extracted a little later? As the arteries supplying the teeth are encased in the jaw bones they can only be massaged before they go in and after they come out. Thus for the lower

jaw the best places would be in front of the lower part of the ears where they are imbedded in the parotid, or salivary gland, and on the chin under the corners of the mouth, where they come out. These two places were massaged in the facial treatment which Mr. Bennett says he copied from Ninon de L'Enclos.

The methods used by these two remarkable people to maintain youth in real old age convince one fully that the Medulla Oblongata together probably with other organs of the head, form the real Fountain of Youth, from which the Tree of Life, the arterial system, is nourished. And also that it is necessary for us to see to it that the bowl of the fountain itself is kept replenished,—otherwise it will slowly run dry through the action of gravity, and the Tree of Life will wither and die.

A consideration of the preceding facts, and the experience of the several different persons cited, lead one to believe that there is a possibility of rejuvenation, both physical and

mental, for everyone who needs it. And it is especially worthy of note that in these cases, the *mental renewal followed the physical.* This shows how dependent the mind is on an *alive*, healthy body, or perhaps I should rather say brain,—to manifest itself at its best. Everyone knows how the mental outlook is affected by the state of the body. As Browning says,

> "Not soul helps flesh
> More than flesh helps soul."

When we hear some people expressing a willingness to die, unless it results from some temporary trouble, we may be assured that they are not in a good physical condition. And even when this hopeless mental attitude is caused by trouble, it is a question whether its first action was not a physical one,—burning up the brain substance, depleting the Medulla, and by thus slowing down the vital process of blood formation bringing on the old age condition with its lack of

physical buoyancy and despondent mental outlook.

So while psychologists are proclaiming the truly marvelous power of the mind over the body, it should not be overlooked that the body also has a wonderful influence on the mind; and with some people this is the least difficult part to work on in the process of restoring or quickening Life in the body.

It is noteworthy too that no psychologist has yet made such a signal victory over old age conditions as did Ninon de L'Enclos, Sanford Bennett, and Col. P. R. Smith. The psychologists also have overlooked the effect of gravity on the body. And it does not seem probable that any mental means will be found to overcome this effect that will not be more expensive of vital energy than the simple physical means that have been suggested. That is, if it be true, as has been stated, that the breaking down of tissue in the brain during intense application is so rapid that three hours of brainwork is as

great a drain upon the physical forces as a whole day of manual labor.

The first one of the three persons mentioned died in 1705, in her 91st year but still retaining her youthful appearance, according to the accounts we have of her. I have not seen it stated what caused her death. Sanford Bennett was accidentally choked to death in his 81st year, and it is stated by a friend of his that "the doctors who attended him at the time marvelled at his wonderful physical development and the youthful appearance of his entire body. His faculties were clear and functioning in excellent order."

More remarkable still is the account of the rejuvenation of Col. Smith, quoted above. This was not commenced until after he was 85 years of age, and he is presumably still living to give testimony to the facts.

The publishers of Sanford Bennett's method, which he uses, say that they have received thousands of unsolicited endorsements testifying to the benefits of the course.

Surely these facts prove that there is some unique value in those and similar exercises, not to be found in the ordinary ones: and everyone may be encouraged by the positive knowledge not only that youth may be retained, but that it may be restored after it has been left behind many years.

"O weary hearts, O slumbering eyes,
O drooping souls, whose destinies
Are fraught with fear and pain,"
Wake up and Live, Rejoice, be Glad,
For Youth returns again!

Appendix—June, 1923

There has just appeared in the public press a remarkable account of a case of rejuvenation through the implanting of a sheep's gland in the body of a woman 65 years old. It is written by herself, and is said to have taken place in New York.

As revolting as this desecration of the human body is, anyone studying the subject of rejuvenation cannot but be interested in her account of her feelings and experiences while this was taking place.

It is very evident from her description that her physical improvement was caused immediately by an increased blood volume, as all rejuvenation must necessarily be. She actually felt the new strange current surging through her limbs on the first day after the operation, and compared it to the sap rising in trees in the spring of the year. An immense appetite also appeared on this first day, taking the place of none. This of course was

to supply material for the formation of more blood. A huge appetite was a noticeable feature of Sanford Bennett's rejuvenating period also, but when this was completed it subsided into the normal again,—this is, for a young man.

The doctor had told this woman that a secretion of this ingrafted gland would get into the blood stream and react on other endocrine glands to revitalize the whole system, in this way taking the place of her own gland which was worn out.

The physiologies name four glands which act reciprocally with this one, the Pituitary, Pineal, Thymus and Adrenals. The first two are located in the head, and the third at the junction of the thorax and neck, while the Adrenals are situated one above each kidney. It is known that all of these have important functions relating to the general condition of the body, but very little is yet understood about them. The action of the Pituitary seems to be necessary to life itself

since an animal in which this body has been removed dies within a few days, after experienceing a fall in temperature, unsteady gait, rapid emaciation, and diarrhea. This takes place also when the anterior lobe alone of this organ is removed,—hence the physiologist has concluded that "the secretion of this gland exercises some profoundly important influence upon metabolism."

The changes in the body following its removal seem to be such as would naturally be produced when a decrease of blood was experienced,—therefore it may at least be conjectured that its function is closely connected with the formation of blood. This is true in different degrees and for different reasons, of each of the other glands mentioned.

The following facts concerning the Thymus gland are taken from Gray's Anatomy. "At birth it weighs about 15 grams, at puberty it weighs about 35 grams; after this it gradually decreases to 25 grams at twenty-five years,

less than 15 grams at sixty, and about 6 grams at seventy years. . . .

"Watney has made the important observation that hemoglobin is found in the thymus. . . . This hemoglobin occurs as granules or as circular masses exactly resembling colored blood corpuscles. He has also discovered, in the lymph issuing from the thymus, similar cells to those found in the gland, and, like them, containing hemoglobin in the form of either granules or masses. From these facts he arrives at the conclusion that the gland is one source of the colored blood corpuscles. More recently Schaffer has observed actual nucleated red-blood corpuscles in the thymus. The function of the thymus is obscure. It seems to furnish during the period of growth an internal secretion concerned with some phases of body metabolism."

The fact that its size is largest in proportion to the rest of the body at birth, and that this is also the time when the proportionate

volume of blood is largest,—that it continues to grow throughout the period of body growth, during which the actual amount of blood must be increasing,—and then diminishes throughout the balance of life, as both the actual and proportionate volume of blood diminishes,—these considerations seem to add strength to the conclusion expressed above that the gland is actively concerned in the formation of blood. It would be extremely interesting to learn whether it is not revived again and put into service during the rejuvenating period.

As all three of these glands seem to be connected with the formation and regulation of the blood, as well as does the Medulla Oblongata, and all are situated near to, and share in the disadvantages of the location of the latter which have been pointed out in this book, it would seem that the gradual decrease in blood volume taking place throughout life should be attributed to the undernourished condition of all of these

organs combined, or, one might say, of the head generally. And, as evidently they would all be revived by an increased flow of blood to the head, the reasons given in this book for the rejuvenation which actually took place in Sanford Bennett and the others mentioned, are given new confirmation by this account of the gland rejuvenation.

The fact that rejuvenation has actually been accomplished, and in a number of instances in this manner, proves that these glands and the Medulla Oblongata can be stimulated to the necessary degree to cause it by natural, normal, wholesome methods, without the profaning of the human body by the introduction into it of any part of sheep, goat, ape or other beast. One would think that there are already enough animal traits exhibited in the human race to cause us to make every effort to eliminate them. It is humiliating indeed to think that there are some who are willing to mingle their very lives with that of an animal. Have we gone

so far in evolution that we can afford to start back on the path of involution?

The worst of this is that every instance of it affects not only the individual submitting to this personal desecration, but it familiarizes the minds of others with it, and seeing its apparent good results, many may be tempted to follow in their footsteps.

Is not this indeed a second temptation of The Beast, rivaling that which took place in the Garden of Eden?

This time he offers New Life,—and Youth. What could be more alluring? What more insidious?

And to whom is the offer extended,—is it to the strong and mentally well-poised of the human race? Ah, no. Listen to the excuses this poor woman makes for herself. "A year ago I was bankrupt in health and courage and pocketbook. My fortune, which had been considerable, had been swept away after the war. Deprived of the alleviation which money alone can bring to old age, I faced

life a white-haired, frightened woman, praying to die and be out of my misery. But death has a way of lingering when it is most desired, and I still had to face its problems. So I settled into a period of gloom, with nothing but my weary thoughts for company, and nothing to do but read. And then it happened that one day my attention was directed to various aspects of the after-the-war surgery in the field of rejuvenation. . . . I had hardly read that rejuvenation was considered possible before my poor old woman's mind was full of hesitating eagerness to try the new thing out." How pathetic. Everyone can see the power of this appeal to one in her condition. And is it not the usual condition of the aged? If they are not helpless and dependent in one way they are in another, and sometimes they are in every way. How galling it is to the spirit to be dependent on others, even if one has every right to expect the most devoted love and attention from them.

Recently I saw a very aged woman selling papers on the street. "Why, you ought to have some grandsons doing this for you," I remarked. "I have six children and fourteen grandchildren," she replied, "but I do not want them to do anything for me. I am all right and can take care of myself." And she tottered on to her stand, which was a seat on the stone steps of a leading merchant in the city that had been secured for her by a kind-hearted colored porter in the house. There she sits every day, and has done this for a year. She is always cheerful, and professes to be satisfied and contented,—but why? Because she compares her present condition with that of dependence—on her own children, for whom she toiled and sacrificed herself during the greater part of her eighty years of life.

This love of independence is a common trait with all of us, it seems; and when it is united with the mental indecision and weakness that so often goes with physical debility, it makes a very vulnerable point indeed for

this new attack of the beast through gland operations.

Therefore it seems to me to be of the utmost importance that the fact should be made known, and published abroad as widely as possible, that rejuvenation as complete and full as any ever experienced, has already been accomplished in a number of instances, and is now being accomplished, through a perfectly legitimate, normal, sane, *evolutionary method*, without the assistance of any beast whatsoever,—or of any doctor except Nature, whose one requirement is obedience to her laws.

Some of these cases are described in this book.

Following Are Some of the Ideas Contained In This Book Which Are Not Taught by The Medical Profession

1. That fat contains no blood, has no cellular activity, and is such a variable quantity in different individuals, and in the same individual at different times that it makes a person's weight a very indefinite standard of comparison in estimating the weight of the blood or any internal organ. Fat might indeed make the body weight almost twice as great at one time as at another, while the objects compared with it were in no way changed.

2. That gravity causes a smaller proportion of blood to go to the head than to the rest of the body, thus in time producing a lack of nourishment there, which brings on old age conditions.

3. That the proportion of blood in the body decreases from birth to old age.

4. That the formation of blood, is regulated by the Medulla Oblongata, and other organs located in the head and throat.

5. That the gradual decrease in the amount of blood is the result of the gradual starvation of these organs through the action of gravity.

6. That as the amount of blood decreases it becomes necessary for the arteries to contract to give the necessary pressure to send the blood through the capillaries and to the head, thus keeping up the normal circulation.

7. That the High Blood Pressure thus produced is a necessary and automatic provision of nature to maintain life, and should not be interfered with except through *removing its cause*. This would mean *increasing the volume of blood* by some means.

8. This increase in blood volume has already been accomplished by a number of people through taking different exercises *in a reclining position, thus sending more blood to the head*, and they have in consequence succeeded in rejuvenating themselves to an amazing degree, and in a short space of time.

9. That the hardening of the arteries is caused by their contraction more than by

mineral deposits, and also, in old age, by the general lack of blood which produces drying and hardening of all the tissues of the body.

10. Mineral and other deposits on the arteries and in the tissues are the result of a reduced volume of blood which is insufficient to carry off completely the waste matter from cellular activity.

11. That extraordinary muscular development is accomplished and maintained at the expense of the more vital organs which are deprived of their normal supply of nourishment for the support of this superstructure.

12. That besides the gradual decrease in blood volume taking place throughout life, it is subject to temporary fluctuations by the hour, day or month, according to the state of health, condition of fatigue, length of time since a meal, etc.

13. That there is a circulation of lymph in the hair shafts by means of which the speedy change in color is produced,—the color being sometimes lost and sometimes restored throughout the length of the hair.

14. That there is a physical cause for the well known opposition often shown toward new ideas. That it is possible to remove this cause, and it was done in the cases of rejuvenation referred to.

THE END

Rejuvenation Accomplished Without Borrowed Glands

A New Theory of Old Age, Explaining How This Is Now Done

This book contains an entirely new theory of the cause of Old Age, explaining in a simple and logical way all its symptoms, including gray hair, high blood-pressure, and the failure of eyes, teeth and hearing before we have finished with them in life's journey.

It also explains how these effects may be warded off for an unknown length of time, and how hair which has become white may be restored to its original color with no applications whatever. *This has already been done, and by this method alone.*

It is a recognition of the fact that we have been ignoring in physiology a great and universal law of nature which we see and calculate the effects of everywhere else. Anyone can easily adjust himself to this law without expense or trouble.

The truth of the theory is practically proved already by the wonderful success of

the Sanford Bennett exercises in rejuvenating old people, explaining as it does the working of the principle in a way of which he himself was unconscious.

It explains the high blood-pressure which accompanies old age as a necessary provision of nature to preserve life in the present normal conditions of that period.

What Some Doctors have said about the New Theory, as Explained in the Magazine Article

"This is well written. You have things here which we never thought about,—I am sure I never thought of them."

"Your article is very interesting, and I think you have some excellent ideas there."

"Permit me to congratulate you for those well-written and wonderful articles. Surely you have given the world ample food for thought. The manner and simplicity in which you express yourself is to be commended."

"I think a great deal of your article. There are no known facts of physiology inconsistent with it."

"I am open to conviction, and can show you how you can make your article stronger."

"I congratulate you on a very able paper."

FROM LUTHER BURBANK

"You have, in my opinion, made a very important discovery which will be of great benefit to mankind."

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